B3 concl'd

using aluminum/silicon carbide composite alloys. It is required that a substrate material is able to be formed easily to be near net shape precisely.

Page 10, lines 2-9, change the paragraph to read:

B4

In view of the current situation as described above, an object of the present invention is to eliminate the problems concerning precision in forming, cost, etc. to provide a substrate material for mounting a semiconductor device, made of a lightweight aluminum/silicon carbide composite alloy which has a homogeneous composition and has the properties required of a substrate material, i.e., a thermal conductivity of 100 W/m·K or higher and a thermal expansion coefficient of $20\text{x}10^{-6}$/°C or lower.

Page 10, lines 13-17, change the paragraph to read:

B5

Another object of the present invention is to provide a method of forming a substrate which has a thermal expansion coefficient with a large range so as to be appropriate for a semiconductor chip or a package to be fixed to the substrate.

Page 10, line 20 through page 11, line 7, change the paragraph to read:

B6

To accomplish the above objects, the present invention provides a substrate material for mounting a semiconductor device, made of an aluminum/silicon carbide composite alloy which comprises an Al-SiC alloy composition part and a non alloy part and dispersed homogeneously silicon carbide granular particles. Silicon carbide granular particles are dispersed from 10 to 70% by weight in the composite alloy, and silicon carbide is distributed homogeneously in the Al-SiC alloy composition part. And the fluctuations of silicon carbide concentration in the Al-SiC alloy composition parts is within 1% by weight, and which has a thermal conductivity of 100 W/m·K or higher and a thermal expansion coefficient of $20\text{x}10^{-6}$/°C or lower.

Page 12, lines 14-20, change the paragraph to read:

B7

The sintering process of the present invention for producing an aluminum/silicon carbide composite alloy, is especially capable of yielding an aluminum/silicon carbide composite alloy having a thermal conductivity of 180 W/m·K or higher by regulating the sintering temperature to a value in the range of from 600 to 750°C to thereby control the interfacial reaction which yields the aluminum carbide and the silicon.

Page 15, lines 3-13, change the paragraph to read:

B8

In the present invention, an aluminum/silicon carbide composite alloy useful as a semiconductor substrate material is produced by sintering to thereby provide a semiconductor substrate material having the desired values of thermal conductivity and thermal expansion coefficient and having a homogeneous Al-SiC composition and a near-net shape, i.e., excellent dimensional precision, the attainment of both of which has been difficult in conventional processes. This substrate material is capable of coping with, not only conventional ceramic packages, and metal packages but also in particular, plastic packages, flip chip bonding, and ball grid array bonding.

Page 15, line 23 through page 16, line 14, change the paragraph to read:

B9

The crystal forms of silicon carbide include hexagonal α-SiC form, which is formed at a high-temperature, and cubic β-SiC form, which is formed at a low-temperature. Although these two forms do not differ in the thermal conductivity of an alloy, α-silicon carbide is susceptible to cleavage. Due to this property, use of α-silicon carbide in a starting powder is apt to result in silicon carbide cleavage due to the pressure applied during compaction into a desired substrate shape. As a result of the cleavage, the compact may contain aggregates made up of fine silicon carbide particles. Since the aggregates have poor adhesion to aluminum in an alloy, they tend to suffer debonding of particles when the alloy is subjected to processing such as grinding, barrel, shot blasting, etc. in the final step. It is therefore desirable to use β-silicon carbide or a mixture of α-silicon carbide and β-silicon carbide. "Debonding of particles' means that particles are displaced from the position to be in the alloy, and the surface of the alloy grows porous.

Page 22, lines 14-25, change the paragraph to read:

B10

In ordinary sintering, densification is generally inhibited by the gas remaining within the alloy. However, the use of nitrogen as a non-oxidizing atmosphere was found to be effective in densification because the nitrogen gas remaining within the alloy turns into aluminum nitride through reactions with aluminum. An alloy containing nitrogen especially in an amount of 0.01% by weight or larger is advantageous for attaining a thermal conductivity of 180 W/m·K or higher. However, if the content of nitrogen exceeds 1% by weight, densification is inhibited rather than enhanced. Therefore the preferred range of the nitrogen content in the aluminum/silicon carbide composite alloy is from 0.01 to 1% by weight.

Page 24, line 24 through page 25, line 2, change the paragraph to read:

B11

And according to aluminum/silicon carbide composite alloys formed as above, a substrate can be formed precisely to be near net shaped or in net shaped without warp or deform. In this case it is not required to machine process with respect to the whole surface.

Page 34, lines 11-20, change the paragraph to read:

B12

The starting powders obtained were compacted at a pressure of 7 t/cm^2 to obtain tablet test pieces having a diameter of 20 mm and a height of 30 mm. These compacts were sintered at 700°C for 2 hours in a nitrogen atmosphere having a nitrogen concentration of 99% by volume or higher. As a result, aluminum/silicon carbide composite alloy sinters were obtained which retained the original shape of the compacted test pieces. However, the alloy of sample 9 was not dense and had voids in a surface layer thereof; this alloy was hence not subjected to the following measurements.

Page 36, line 16 through page 37, line 2, change the paragraph to read:

B13

The starting powders obtained were compacted at a pressure of 7 t/cm^2 to obtain tablet test pieces having a diameter of 20 mm and a height of 30 mm. These compacts were sintered in a nitrogen atmosphere to remove a binder. Then after degassing the tablet test pieces in a pressured chamber, they were pressure-infiltrated in an aluminum melt. As a result, aluminum/silicon carbide composite alloy having silicon carbide contents of 71 % by weight were obtained. It was difficult to obtain aluminum/silicon carbide composite alloy having silicon carbide contents of less than 70 % by weight by similar method. Because more porosity in the formed silicon carbide compact is required, and the formed silicon carbide compact is not stiff enough to keep its shape.

Page 53, line 21 through page 54, line 7, change the paragraph to read:

B14

An aluminum powder having an average particle diameter of 25 μm was mixed with a silicon carbide powder having an average particle diameter of 35 μm in such a proportion as to result in a silicon carbide content of 50% by weight. The mixture was homogenized with a kneader for 1 hour in the same manner as in the above Examples. Thus, an aluminum/silicon carbide starting powder was obtained. The starting powder obtained was compacted at a pressure of 7 t/cm^2. The resultant compacts were sintered at 700°C for 2 hours in a nitrogen

B14

atmosphere having a nitrogen concentration of 99% by volume or higher. As a result, aluminum/silicon carbide composite alloy sinters were obtained which retained the original shape of the compacted test pieces.

Page 61, lines 2-8, change the paragraph to read:

B15

The starting powders obtained were compacted at a pressure of 7 t/cm^2 to obtain test pieces having dimensions of 100 mm by 25 mm by 2 mm (thickness). These compacts were sintered at 700°C for 2 hours in a nitrogen atmosphere having a nitrogen concentration of 99% by volume or higher. As a result aluminum/silicon carbide composite alloy sinters were obtained which retained the original shape of the compacted test pieces.

See the attached Appendix for the changes made to effect the above paragraphs.